

The book comprises an easily handled volume of 456 pages, excluding an extensive and well-chosen bibliography and useful index. The text figures are almost all clear, well laid-out line diagrams; only two half-tone illustrations are included. The text is organized into three sections:

- Part I. *Basic Concepts*: contains chapters on "A Guide to the Eukaryotic Genome" and "Aims and Principles of Gene Transfer".
- Part II. *Gene Transfer Systems*: deals in four chapters with microbial eukaryotes (yeasts, slime molds and *Chlamydomonas*; animal cells; whole animals and plants respectively).
- Part III. *The Use and Exploitation of Gene Transfer Technology*: covers gene isolation and identification, gene expression, DNA components of chromosomes, protein structure and function, human disease and, finally biotechnology in industry (especially the pharmaceutical industry), and agriculture.

Chapter 1, "A guide to the Eukaryotic Genome" simply contains too much material, too rapidly presented in too tight a format, to appeal to readers who need "a gentle introduction to the eukaryotic genome" (as the back cover has it). There is too much jargon. How many molecular biologists recognize or need the term orthon, for instance? Tellingly, having defined the term, the authors don't appear to use it! Remember this is a chapter which the reader is told is "necessarily superficial and can be skipped". For those who shouldn't skip it, the presentation will be largely unappealing and indeed off-putting. Such readers should see Volumes I and II of Watson *et al.* "Molecular Biology of the Gene", Fourth edition (Benjamin/Cummings 1987); a most lucid, attractive and authoritative work that every biologist should own, and which now covers a great deal of the background material on eukaryotic systems in Chapters 1 and 4-11 of the Kingmans' book.

Another significant weakness of this text concerns that part of Chapter 5 which deals with gene manipulation in *Drosophila*. This section lacks cohesion and conviction. Homeotic genes are not adequately defined (p. 175). Four different spellings of the gene *Antennapedia* are offered (p. 175; p.176; p.178; p.316, twice), that in Fig. 5.11, p.178 being correct.

The writing style is concise but consistently rather didactic, perhaps reflecting origins in the authors' undergraduate teaching, for they state in the Preface that much of the book is based on their third-year undergraduate biochemistry course at Oxford. By halfway through I was tired of being told that such-and-such is called so-and-so e.g. the larval stages are called larval instars, p.175; homeotic genes, p.175; homeobox, p.177 etc). There is an apparent but uneven tendency to talk down to the reader, again nowhere more evident than in the sections of Chapter 5 dealing with *Drosophila* development. Few significant typographical errors were detected. Cellulose in Fig. 6.6, p.202 should read cellulase.

I found the best of the book to lie in the chapter on microbial eukaryotes (as one might anticipate from the authors' own research interests in yeast genetics), gene transfer into animal cells and into plants. The chapter on plants is excellent: certainly one of the most readable, satisfying, yet concise summaries of the areas that I have seen. I felt that Part III, on exploitation of recombinant DNA technology in eukaryotes was competent and useful rather than exciting: most of the ground traversed in gene expression, chromosome components, protein structure and function, human disease and biotechnology is well reviewed but very much "second generation". A whiff at least of the third generation would make me feel that the more general zoological reader, for instance, would see the final rewards that will be obtained in knowledge of developmental

processes at higher levels, in understanding of evolutionary mechanisms, of ageing, of the genetic control of neural circuit wiring, of brain chemistry, of learning, behaviour and memory. But here I was disappointed.

Unfortunately for the publishing industry, texts such as this obviously date extremely rapidly: a useful working life of perhaps 3-4 years at most seems a reasonable guess. Who, then, will buy this very expensive book and why? I believe that it fits perfectly as a single volume work which will help biologists/molecular geneticists trained primarily on prokaryotes to enter the mainstream of eukaryotic gene manipulation using eukaryotic systems, especially in areas related directly to the biotechnology industries as such. This is a narrow niche, perhaps, but many scientists primarily trained in microbiology/biochemistry should find this a helpful summary and direction indicator during the transition phase towards eukaryotic specializations.

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## Confessions of a Frozen Zoologist

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In June of last year, amid the drizzle and grey sky that typifies that month, I dreamed of my coming escapades. I planned my summer holidays in Queensland, lazing under swaying coconut palms, sipping banana smoothies, occasionally trotting down to the beach and into the gentle warm water. My daydream was nowhere near reality.

I am a high school teacher (then at Benilde High School — Bankstown) teaching science. Every year various student competitions are conducted in science, and I usually have students entering many of these competitions. Last year some of my students entered the Science Summer Prize. In this competition, conducted by ANARES (Australian National Antarctic Research Expedition), students were required to formalise and submit a short research project designed for application in Antarctica. My role was to oversee and facilitate my students ideas and proposals. My Christmas holidays in the sun evaporated when one of my students, Peter Shields, won the Summer Science Prize for his project on the distribution biomass of Antarctic plankton. The prize was a trip for the student and his teacher to an Australian base in Antarctica to do the project!

I don't know who got the biggest shock, Peter or me. Antarctica! We'll freeze. All sorts of excuses raced around my head saying I'd better not go. Common sense told us it would be uncomfortable (perhaps even dangerous), but underneath there was this terrible sensation that this



would be a fantastic adventure. We would be fools not to accept it. In a flush of uncontrolled excitement we accepted the prize.

All of a sudden Peter and I found ourselves before the Commonwealth Medical Officers. They prodded us, poked us, X-rayed us, took so many blood samples that I looked like the walking dead, gummed us up with electrodes, and checked all our moving parts. I had bits tested that I didn't know existed. At each stage we were informed that an unfavourable medical report would prevent us from being able to go to the Great Southern Continent. Shock upon shock, I passed the medical. Unfortunately, Peter didn't (he was diagnosed as a latent asthmatic). The C.M.O.'s advice was that there was a high risk that the cold air could trigger an asthmatic attack and so they refused to take him. I wanted to see what the ANARES people would decide to do. By this stage I was feeling more favourable about the trip and really wanted to go.

Finally, after some negotiations, I was instructed to choose a replacement for Peter. One of Peter's best friends, Anthony Hampton, was selected (incidentally they are still good friends) and so he had to run the gauntlet at the C.M.O.s. After he received a clean bill of health, all sorts of communiques began arriving, telling us about what to expect. ANARES would cover all costs from the time we arrived in Hobart, to Antarctica and return to Hobart. We were lucky in that Australian Geographic sponsored our airfares to and from Hobart.

Instruction booklets arrived in the mail. Where we had to be, what would happen in Hobart, what to expect in Antarctica, what to take, what not to take. It was all happening. We arrived in Hobart early in December. We were taken to the Antarctic Division Headquarters at Kingston where we were fitted out in woollen and snow-proof gear. Everybody travelling on the ship to Casey (the base where we were destined for) had to attend briefing sessions. This is the stuff nightmares are made of.

We were told Antarctica was a dangerous place. The rule of the base were explained. We were told what to do in the event of blizzards, falling into crevasses, being attacked by leopard seals, the effects of hypothermia, wind chill factors, emergency medical procedures, and 101 other ways to die down there. As if this wasn't bad enough we were shown film footage of Antarctic ships in mountainous seas, trapped in pack ice, bouncing off icebergs or simply sinking. Again we were told the many varied and wonderful ways that you could sustain fatal injuries during the voyage. The danger was real. The message was clear.

A day later we were walking up the gangplank of the *S. S. Icebird* — an ice class cargo ship. A crowd of wives and family assembled at the wharf. People were crying. Husbands were leaving their families for 12 or 18



*Fig. 1. S.S. Icebird anchored in Casey Bay. Unloading operations were done at a furious pace as the ship would have to unanchor and head out to open sea at the first signs of bad weather approaching.*

months. Streamers festooned the decks. Anthony and I looked on, completely lost in the emotion of the occasion. Aboard were meteorologists, atmospheric physicists, army personnel, doctors, (including a psychologist), storemen, radio operators, and a hodge podge of miscellaneous, but useful people. Thankfully, they were all very approachable. Many were in the same state of apprehension that we felt.

Rolling seas began to push the ship around. Creaks and groans and the accompanied smash of crockery attested to our unpredictable motion. Many were seasick. Anthony and I were too busy to be sick. We were too involved in doing sea water samples, testing to see what sort and how many microscopic creatures lived in the ever cooling waters. The project was to assess the distribution and biomass of marine plankton in the seas between Australia and Antarctica. To do this, regular samples of ocean water were collected during the ship's passage to and from Antarctica. The tiny animals and plants in the water samples were sorted out and identified. Changes in the plankton types were related to sea water temperature and proximity to land.

Five days out of Hobart we sighted our first iceberg. It was as big as the ship. Shortly afterwards more appeared. Watchers were positioned on both sides of the ship as ice flows began to thicken. Two days later the sea was solid ice. The ship would have to smash its way into the dimensionless white surrounds. Sometimes the ice stopped us and we were forced to reverse.

Penguins and seals made an appearance in the pack ice. For a day and a half the ship ploughed, metal against ice, until we breached clear water. Another day and land was sighted. Bare rocky headlands were exposed. Unimaginably large expanses of ice and snow filled the vista. All sense of proportion was lost.





*Fig. 2. Icebergs trapped in the pack ice. Visibility was poor and they became a serious navigation hazard.*

A small boat was launched to take in mail. We waited for 6 hours before we could set foot ashore. The scene was chaotic. Tractors and cranes work in furious activity. Containers from the ship were being unloaded. The year's provisions and equipment swing over the ship's decking. Anthony and I kept clear of the operation until we were collared by a storeman. We were there so we could help. They worked hard and fast, not knowing if the weather would change and the ship would have to pull out.

We feared that our entire trip would be spent as manual labourers. No, fortune smiled on us. When the bulk of the work was done, opportunities were given freely for us to see the ice cliffs, to ski around the frozen coastline, to ride in caterpillar tread vehicles to abandoned bases, to skiddo to snow hillocks and glacial moraines. Too much was happening too soon. I couldn't ski but I was on my skis for anywhere up to 16 hours a day. I cannot describe the scenery. It is frightening in its impact and magnitude. Penguins (mainly Adele's) frequented the camp and had their nests on the rocky coastal outcrops. Seals lay wearily on the frozen sea ice between the islands and the mainland. Skuas, petrels and Cape Pigeons swirled through the air. In tiny crevasses in the rock black fungi or miniature green moss defied the elements.

While at Casey, sampling was also carried out in the bays around the Australian base. Plankton types and numbers were affected by run-off from the base. Plankton densities were higher than normal. Certain types such as large copepods and amphipods were particularly favoured. The effects of such a change on the other aspects of the local food chain were unknown. The results of the project indicated that the factors that control the distribution and abundance of plankton were diverse and were generally poorly understood (with perhaps krill being the exception).

The people were not what I expected. They were hardy and tended not to get too disturbed by the climatic extremes. They regarded us with some amusement. We were nearly always over-clothed and sweating. We were clumsy on our feet and slow to move. They were not. Still they accepted us into their tight little community. It was not until the return leg on the ship that I began to realise what Antarctica meant and did to people. Those who had overwintered were uncertain and afraid of returning to the homeland. Why? The time that they have been away things have probably changed (for example, one day I showed them the new \$10 note with the hologram on — I could not convince them that it was legal



tender. They regarded it as "funny money", akin to monopoly money). Would they still be welcome within their own families? Would they fit in? What was it that they were really returning to? For some the trepidation of the return trip was severe. Others could not wait to get back. Some vowed never to get to the Antarctica again while others said they would be back next season. Whatever their answer, their experiences had left an impression.

I was only in Antarctica for a short time (we were back in Hobart for the New Year) and it had left an impression on me. I would love to go back again, but I don't think I could survive a year there. It is overpowering. I keep thinking about mankind's responsibility to our planet when I think upon Antarctica. The places where people have been in the frozen continent are unmistakable. Antarctica is a fearsome rival, but I for one, do not want to see it tamed.

Fig. 3. Adele penguin rookery on Shirley Island. The rookeries are on exposed rocky island knolls. As the sea ice is still frozen over many of the islands can be reached on foot.



## 1989 ANNUAL GENERAL MEETING

Notice is hereby given that the 1989 Annual General Meeting of the Society will be held in the Society's Rooms at the Education Centre, Taronga Zoo, at 3.00 p.m. on Saturday, 30 September. (The Education Centre can be reached from the west end of the main zoo car park.)

Business: To receive the Annual Report and Balance Sheet for the year 1988-89 (Edney Lawrence and Co., 706 Military Road, Mosman, are the Society's auditors.)

The following is a list of the current members of Council. Resignations were received during the year from: Ms Joanne Brydon, Dr Gordon Grigg, Ms Tanya Leary and Mrs Wendy Reid due to moves inter-state or overseas. Those members marked with an asterisk are to retire, and all but Mrs Penni Brydon (now resident in Dubbo) are eligible and available for re-election.

*Mrs Penni Brydon	Mr Dan Lunney	Dr D. S. (Woody) Horning
*Mr Jim Bailey	*Mr Ron Strahan	Dr Leighton Llewellyn
*Mrs Marianne Cochrane	Dr David Butcher	Dr Rick Shine
Dr Tim Flannery	*Ms Shelly Burgin	Dr Arthur White
Mr Jean-Claude Herremans	Mr John Disney	*Mr Edward Wingfield
Dr Jean Joss	Dr Sue Hand	

Further nominations for these vacancies (eight in all) must be in the hands of the Secretary at least seven days prior to the Annual General Meeting (i.e., before 23 September). Each candidate must be a financial member of the Society, and be nominated by two financial members of the Society: each nomination must be accompanied by the consent in writing of the nominee.

**GUEST SPEAKER:** Dr Woody Horning and his address will begin at 4.15 p.m., and is open to the public. The topic will be: The Natural History of Macquarie Island and its Feral Animals: Cats, Rats, Wekas, Rabbits.

Following the meeting, at about 6.00 p.m., there will be an informal buffet-style dinner at an all-inclusive cost of \$10.00 for adults (children under 12, \$5.00). Please notify the Secretary if you wish to attend (Telephone: 969 7336).